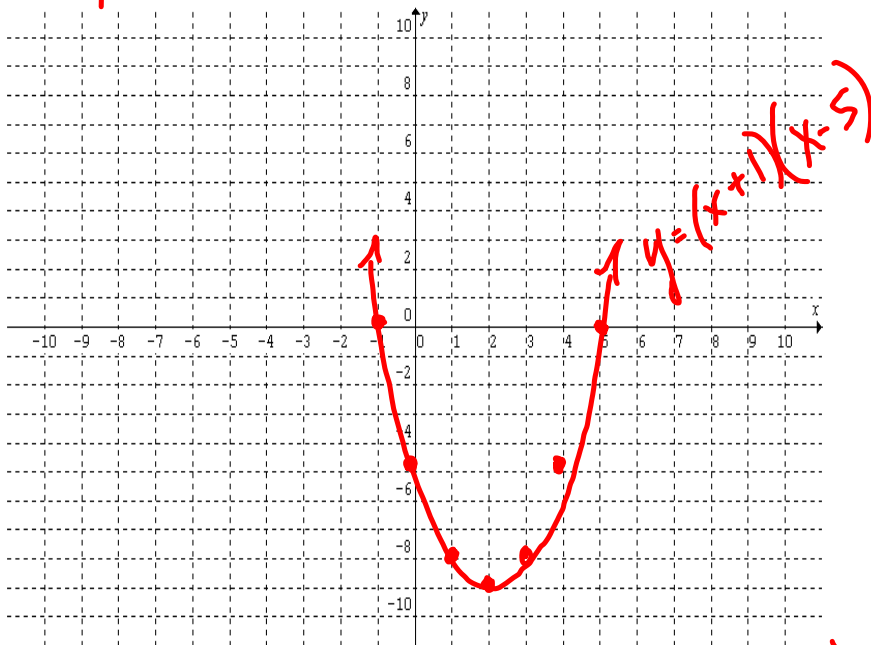


Lesson 4.3: Factored Form vs. Standard Form

1. Consider the relation $y = (x+1)(x-5)$. Graph this relation by creating a table of values.

x	y	Calculations
-1	0	$\Rightarrow (-1+1)(-1-5) \rightarrow (0)(-6)$
0	-5	$\rightarrow (0+1)(0-5) \rightarrow (1)(-5)$
1	-8	$\rightarrow (1+1)(1-5) \rightarrow (2)(-4)$
2	-9	$\rightarrow (2+1)(2-5) \rightarrow (3)(-3)$
3	-8	$\rightarrow (3+1)(3-5) \rightarrow (4)(-2)$
4	-5	$\rightarrow (4+1)(4-5) \rightarrow (5)(-1)$
5	0	$\rightarrow (5+1)(5-5) \rightarrow (6)(0)$

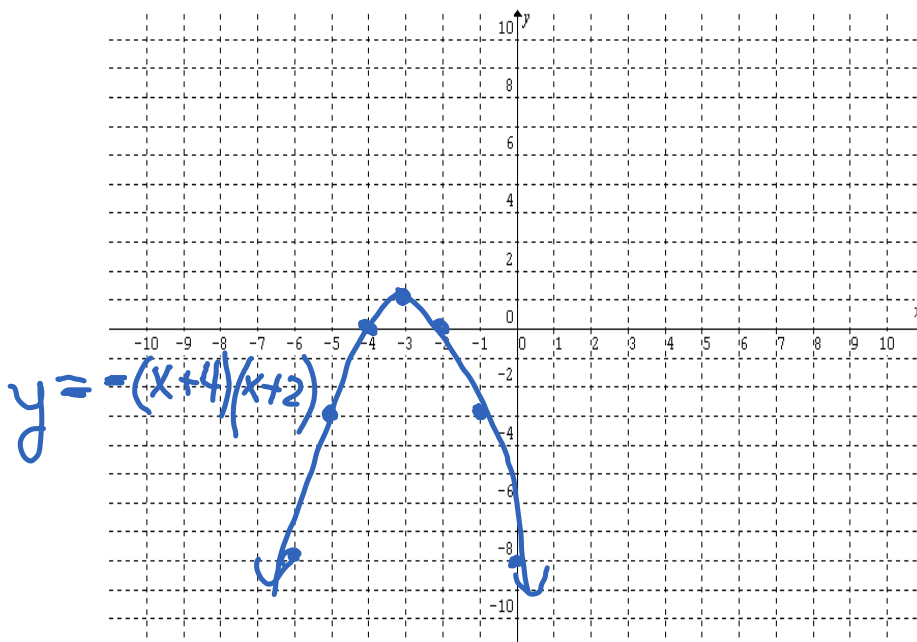


- 1) What are the coordinates of the vertex? $(2, -9)$
- 2) What is the minimum value? -9
- 3) What is the maximum value? *none*
- 4) How many zeros are there? 2
- 5) What are the coordinates of the zeros? $(-1, 0)$ & $(5, 0)$
- 6) What are the coordinates of the y-intercepts? $(0, -5)$

2. Consider the relation $y = -(x+4)(x+2)$. Graph this relation by creating a table of values.

x	y	Calculations
-6	-8	$\rightarrow -(-6+4)(-6+2) \rightarrow -(-2)(-4)$
-5	-3	$\rightarrow -(-5+4)(-5+2) \rightarrow -(-1)(-3)$
-4	0	$\rightarrow -(-4+4)(-4+2)$
-3	1	$\rightarrow -(-3+4)(-3+2) \rightarrow -(1)(-1)$
-2	0	$\rightarrow -(-2+4)(-2+2)$
-1	-3	
0	-8	

Vertex



1) What are the coordinates of the vertex? $(-3, 1)$

2) What is the minimum value?

3) What is the maximum value? 1

4) How many zeros are there? 2

5) What are the coordinates of the zeros?

$(-4, 0)$ & $(-2, 0)$

6) What are the coordinates of the y-intercepts?

$(0, -8)$

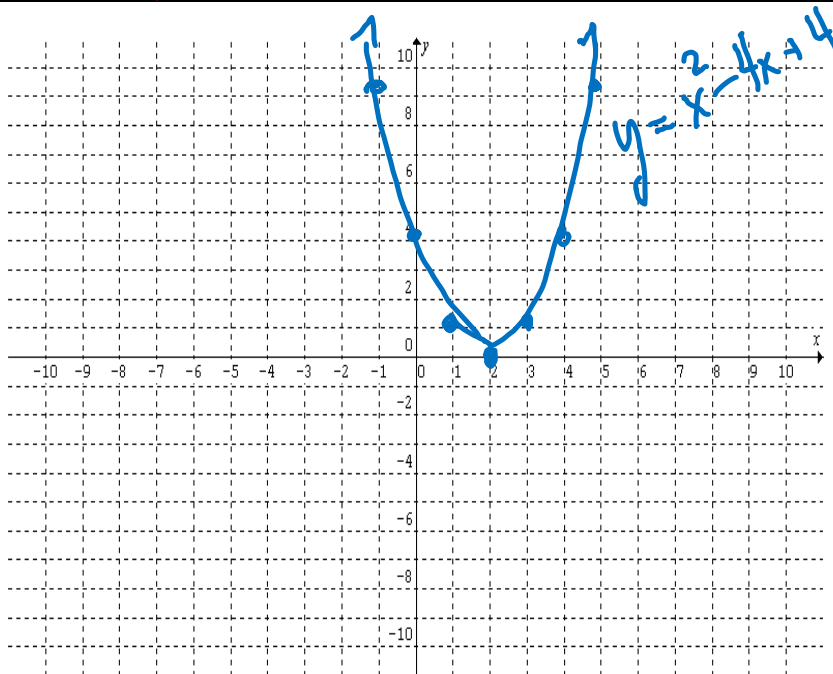
7) What is the equation of the axis of symmetry?

$x = -3$

3. Consider the relation $y = x^2 - 4x + 4$. Graph this relation by creating a table of values.

x	y	Calculations
-1	9	$\Rightarrow (-1)^2 - 4(-1) + 4 \rightarrow 1 + 4 + 4$
0	4	$\rightarrow (0)^2 - 4(0) + 4 \rightarrow 4$
1	1	$\rightarrow (1)^2 - 4(1) + 4 \rightarrow 1 - 4 + 4$
2	0	$\rightarrow (2)^2 - 4(2) + 4 \rightarrow 4 - 8 + 4$
3	1	$\rightarrow (3)^2 - 4(3) + 4 \rightarrow 9 - 12 + 4$
4	4	
5	9	

Vertex



- 1) What are the coordinates of the vertex? $(2, 0)$
- 2) What is the minimum value? 0
- 3) ~~What is the maximum value?~~
- 4) How many zeros are there? One
- 5) What are the coordinates of the zeros? $(2, 0)$
- 6) What are the coordinates of the y-intercepts? 4
- 7) What is the equation of the axis of symmetry? $x = 2$

4.3a : Finding the y-Intercept of a Quadratic Equation

- Find the y-intercept for each of the equations

Note any patterns you see.

Equation	y-intercept
$y = x^2 - x - 2$	-2
$y = -x^2 + 2x - 8$	-8
$y = -x^2 - x + 6$	6
$y = (x-1)(x-2)$	2
$y = -(x+4)(x+3)$	-12
$y = (x+3)^2$	9

- How can you determine the y-intercept by looking at a quadratic equation?

if in standard form the y-intercept is the last number (c)

- Which form of the quadratic equation is easiest to use to determine the y-intercept? Explain your choice.

$y = ax^2 + bx + c$ standard form

- Using your conclusion from question 2, state the y-intercept of each and check using a calculator.

Equation	y-intercept	Does it check?	
		Yes	No
$y = x^2 - 2x - 8$	-8		
$y = x^2 - x - 6$	-6		
$y = x^2 + 3x + 2$	2		
$y = (x-4)(x-1)$	4		
$y = (x-2)(x+5)$	-10		

4.3b: Quadratic Equations

Part A

1. Find the y-intercept for each of the following quadratic equations given in factored form. Write the equations in standard form. Show your work.

a) $y = (x-5)(x+2)$
=
=

standard form: $y = x^2 - 3x - 10$
y-intercept: -10

b) $y = (x+4)(x-3)$
=
=

standard form: $y = x^2 + x - 12$
y-intercept: -12

Part B

Using the diagrams in Part A, find the x- and y-intercepts for each quadratic relation. Use the information to make the sketch on the grid provided.

1. standard form:
 $y = x^2 + 3x + 2$

factored form:

$$0 = (x+1)(x+2)$$

y-intercept: 2

first x-intercept:

$$-1$$

second x-intercept:

$$-2$$

